BOROUGH OF MANHATTAN COMMUNITY COLLEGE
City University of New York

Department of Mathematics

Title of Course: Linear Algebra
Course: MAT 315
Semester:
Credits: 3

Class hours: 3
Lab hours (if applicable):
Instructor Information:
Tel #:
Office:
Email:

Course Description: This course is designed to cover the usual topics in a linear algebra course (e.g., vector spaces, matrices, linear equations) as well as several special topics required by coursework for electrical engineering students (Boolean functions, switching circuits, minimal Boolean functions).

Prerequisites/Co-requisites: Prerequisite: Calculus II (MAT 302) or Departmental approval.

Student Learning Outcomes:

1) Students will be able to express and solve systems of linear equations in matrix form using matrix operations.
2) Students will be able to calculate determinants and apply them to solve system of linear equations (Cramer's Rule).
3) Students will be able to identify vector space, subspace, and calculate the dimension of a vector space, kernel and the range of linear transformations.
4) Students will be able to calculate eigenvalues and eigenvectors of a square matrix.

Required Text: Linear Algebra and its Applications, Third Edition, David C. Lay, Addison Wesley Publishers, 2003.

Evaluation & Requirements of Students: The student receives a letter grade based on classwork and examinations. Students are required to attend all schedule of classes.

Outline of Topics:

TOPICS TEXT PAGE

Linear Equations in Linear Algebra

1.1 Systems of Linear Equations
1.2 Row Reduction and Echelon Forms
1.3 Vector Equations
1.4 The Matrix Equation Ax=b
1.5 Solution Sets of Linear Systems
1.6 Applications of Linear Systems
1.6 Linear Independence
1.7 Introduction to Linear Transformations
1.9 The Matrix of a Linear Transformation

Matrix Algebra

2.1 Matrix Operations
2.2 Inverse of a Matrix
2.3 Characterizations of Invertible Matrices
*2.4 Partitioned Matrices
*2.5 Matrix Factorizations

Determinants

3.1 Introduction to Determinants
3.2 Properties of Determinants
3.3 Cramer's Rule, Volume, and Linear Transformations

Vector Spaces

4.1 Vector Spaces and Subspaces
4.2 Null Spaces, Column Spaces, and Linear Transformations
4.3 Linearly Dependent Sets: Bases
4.4 Coordinate Systems
4.5 The Dimension of a Vector Space
4.6 Rank
4.7 Change of Basis

Eigenvalues and Eigenvectors

5.1 Eigenvectors and Eigenvalues
5.2 The Characteristic Equation
5.3 Diagonalization
5.4 Eigenvectors and Linear Transformations

Orthogonality and Least- Squares

6.1 Inner Product, Length, and Orthogonality
6.2 Orthogonal Sets
6.3 Orthogonal Projections
6.4 The Gram-Schmidt Process
6.5 Least Squares Problems

Symmetric Malices and Quadratic Forms
7.1 Diagonalization of Symmetric Matrices
7.2 Quadratic Forms

*** Denotes Optional Material**

College Attendance Policy
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Academic Adjustments for Students with Disabilities
Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

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